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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WANG, GEORGE Y	

ART UNIT	PAPER NUMBER
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/697,760	LU ET AL.
	Examiner	Art Unit
	George Y. Wang	2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-2, 4-7, 9-11, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara et al. (U.S. Patent No. 5,438,421, hereafter "Sugawara") in view of Bryan-Brown et al. (U.S. Patent No. 5,917,570, hereafter "Bryan-Brown").

3. As to claim 1 and 18, Sugawara discloses a liquid crystal display (LCD) device comprising a first substrate (fig. 5, ref. 18) having a grooved surface profile (fig. 5, ref. 16), an alignment film layer of inorganic material formed on the grooved surface and having a grooved surface profile, where the alignment film material (fig. 5, ref. 20) is aligned in response to an ion beam (fig. 5c, "ion beam"; col. 11, line 55) incident to the grooved surface in a direction parallel to a groove direction, a second substrate (fig. 13, ref. 41) aligned opposite the first substrate and having liquid crystal (LC) material (fig. 13, ref. 42) deposited in between.

However, the reference fails to specifically disclose a grooved surface to generate increased alignment force for constraining deposited LC molecules to align parallel to the grooves.

Bryan-Brown discloses an LCD device where the LC molecules align parallel to the grooves of the grooved surface of the alignment film (fig. 5a).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the LC molecules align parallel to the grooves of the alignment film since one would be motivated to provide pretilted alignment that is essential in avoiding reverse tilt disclinations which can lead to poor device quality (col. 1, lines 59-62), thus providing enhanced LCD performance.

4. As per claim 2, Sugawara discloses an LCD as recited above where the material of the underlayer comprises an organic resin material (col. 11, lines 50-51).

5. As to claim 4, Sugawara discloses an LCD as recited above where the second aligned substrate (fig. 21, ref. 41) opposite the first substrate includes a top alignment layer (fig. 21, ref. 45) having a flat surface profile.

6. As per claim 5, Sugawara discloses an LCD as recited above where the second aligned substrate (fig. 10, ref. 41) opposite the first substrate includes a top alignment layer (fig. 10, ref. 48) having a grooved surface profile.

7. As to claims 6-7, Sugawara discloses an LCD as recited above, however, the reference fails to specifically disclose a surface anchoring energy that increases when compared to LC materials deposited between flat substrate surfaces and aligning LC materials parallel to the grooves enables decreased decreased potential energy.

Bryan-Brown discloses an LCD device where the LC molecules a surface anchoring energy that increases when compared to LC materials deposited between flat substrate surfaces and aligning LC materials parallel to the grooves enables decreased decreased potential energy (fig. 5a, 5b; col. 5, lines 4-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a surface anchoring energy that increases when compared

to LC materials deposited between flat substrate surfaces and aligning LC materials parallel to the grooves enables decreased decreased potential energy since one would be motivated to provide pretilted alignment that is essential in avoiding reverse tilt disclinations which can lead to poor device quality (col. 1, lines 59-62), thus providing enhanced LCD performance.

8. Regarding claims 9-11, Sugawara discloses an LCD as recited above where the grooves are not continuous along a lengthwise direction, and where the grooves terminate in a length direction and restart in a slightly difference location with different height and widths (fig. 1, 2), however, the reference fails to specifically disclose a grooved surface profile of the alignment film being sinusoidal.

Bryan-Brown discloses an LCD device having a grooved surface profile of the alignment film being sinusoidal (col. 1, line 57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a grooved surface profile of the alignment film being sinusoidal since one would be motivated to provide pretilted alignment that is essential in avoiding reverse tilt disclinations which can lead to poor device quality (col. 1, lines 59-62), thus providing enhanced LCD performance.

9. Claim 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara in view of Bryan-Brown, and in further view of Callegari et al. (U.S. Patent No. 6,020,946, hereafter "Callegari").

Sugawara, when modified by Bryan-Brown, discloses an LCD as recited above, however, the reference fails to specifically disclose an alignment film of inorganic material being a diamond-like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, SiC, SiO_2, Al_2O_3, CeO_2, SnO_2, and $ZnTiO_2$.

Callegari discloses an LCD device having an alignment film of inorganic material being a diamond-like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, SiC, SiO_2, Al_2O_3, CeO_2, SnO_2, and $ZnTiO_2$. (col. 3, lines 1-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have an alignment film of inorganic material being a diamond-like carbon or selected from a group comprising amorphous hydrogenated silicon, glass, SiC, SiO_2, Al_2O_3, CeO_2, SnO_2, and $ZnTiO_2$ since one would be motivated to provide an optically transparent and amorphous or fine-grained material, which are comparable to polyimide films but require fewer steps and are less costly to manufacture (col. 3, lines 8-15). Ultimately, this serves to provide greater design flexibility in LCD devices without sacrificing its optical characteristics (col. 3, lines 16-24).

Response to Arguments

10. Applicant's arguments filed September 26, 2005 have been fully considered but they are not persuasive.

Applicant amends independent claim 1 to recite the new limitation that the alignment film of inorganic or organic material is subject to an ion beam incident to the

grooved surface "to thereby generate increased alignment force for constraining deposited LC material to a desired direction." However, it is noted that the limitation can be construed as either a product-by-process or intended use limitation. If it is a product-by-process limitation, it is noted that a product-by-process limitation is recognized as limited by and defined by the process and determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP 2113. In this case, the subjecting of the grooved surface by an ion beam is a process limitation to generate a grooved surface for alignment of LC material. Even assuming that the limitation is patentable, it is noted that Sugawara clearly teaches that the ion beam is used to etched the grooved surface profile. While Applicant admits that the ion beam treatment is for etching, he argues that it is not for "alignment." However, this is not a correct understanding of ion beam etching. The purpose of the etching is to provide a grooved profile on which the alignment layer (20) is situated. Thus, the grooved alignment layer has an effect on the alignment of the LC material as a result of ion beam etching.

If the limitation is construed as an intended use limitation, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

In this case, even if such a limitation were deemed be structural, Applicant's limitation still does not place the claim in condition for allowance. Applicant argues that the ion beam treatment is not for "alignment," but rather for etching. However, it is noted again that the purpose of the etching is to provide a grooved profile on which the alignment layer (20) is situated. Thus, the ion beam incident on the grooved surface ultimately generates an increased alignment force on the alignment of the LC material.

With regard to claim 18, it is noted that the claim merely specifies the ion beam treatment, which is not patentable matter in the device claim because it is either a product-by-process limitation or an intended use limitation. For the same reasons above, the claim does not place the application in condition for allowance at this time.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Y. Wang whose telephone number is 571-272-2304. The examiner can normally be reached on M-F, 8 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

George Y. Wang
Examiner
Art Unit 2871

December 7, 2005

ANDREW SCHECHTER
PRIMARY EXAMINER